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EXAMINER	
ORTIZ, BELIX M	

ART UNIT	PAPER NUMBER
2175	4

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/050,762	MERUGU ET AL.	
	Examiner	Art Unit	
	Belix M. Ortiz	2175	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

DOV POPOVICI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2-3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-6, 10, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. (U.S. patent 6,567,408).

As to claim 1, Li et al. teaches a method for creating and/or modifying a dynamically updateable, searchable packet classification databank (see column 1, lines 17-19 and column 3, lines 63-66), comprising the steps of:

receiving a collection of packet classification rules, each packet classification rule being represented as a plurality of binary locations (see column 3, lines 63-66 and column 9, lines 61-65);

selecting an index key based on a common location among the packet classification rules at a first level, such as to enable partitioning of the collection into two or more siblings at a second level, wherein the binary value of the common location represents a feature whereby the composition of each

sibling contains packet classification rules possessing a common feature (see figure 7A; column 3, lines 66-67; column 4, lines 1-34; column 8, lines 65-67; and column 9, lines 1-4); and

selecting an index key based on a second common location among the packet classification rules at the second level, such as to enable partitioning of at least one of the two or more siblings at the second level into two or more siblings at a third level (see figure 7A and column 4, lines 20-34).

As to claim 2, Li et al. teaches the method further comprising the step of:

selecting an index key based on a third common location among the packet classification rules at the third level, whereas to enable partitioning of at least one of the two or more siblings at the third level into two or more siblings at a fourth level (see column 10, lines 9-16).

As to claim 3, Li et al. teaches the method further comprising the step of:

repetitively partitioning each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold (see column 3, lines 66-67; column 4, lines 1-3; and column 4, lines 8-19).

As to claim 4, Li et al. teaches wherein the partition threshold is predicated on a maximum number of rules residing in the sibling at the respective level (see column 6, lines 38-42 and column 8, lines 25-30).

As to claim 5, Li et al. teaches wherein the partition threshold is predicated on a maximum number of levels (see column 3, lines 23-26 and column 3, lines 53-55).

As to claim 6, Li et al. teaches wherein each sibling at a respective level has a substantially equivalent quantity of the packet classification rules (see column 1, lines 18-23 and column 3, lines 52-59).

As to claim 10, Li et al. teaches the method further comprising the step of:

receiving at least one packet classification rule within the collection that has one or more location coordinates denoted as both binary values (see column 9, lines 61-65).

As to claim 13, Li et al. teaches the method further comprising the steps of:

receiving at least one packet classification rule within the collection that has two or more location coordinates that denote a feature having a range of values (see column 8, lines 15-19; column 8, lines 36-40; and column 12, lines 25-29); and

decomposing the at least one packet classification rule into two or more packet classification divisional rules, wherein the selecting an index key steps

include processing the divisional rules as part of the collection (see column 11, lines 20-21; column 18, lines 31-34; and column 18, lines 41-45).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 14, 18-20, and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. patent 6,567,408) in view of Carr et al. (U.S. patent 6,600,744).

As to claim 14, Li et al. does not teach the method further comprising the step of:

manifesting a query key based on index keys selected to partition the packet classification rules.

Carr et al. teaches a method and apparatus for packet classification in a data communication system (see abstract), in which he teaches the method further comprising the step of:

manifesting a query key based on index keys selected to partition the packet classification rules (see figure 4, character "400").

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al., to include the method further comprising the step of:

manifesting a query key based on index keys selected to partition the packet classification rules.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al. by the teaching of Carr et al., because the method further comprising the step of:

manifesting a query key based on index keys selected to partition the packet classification rules, would enable the method, because the partitioning process is initiated to construct the extraction function and the extraction function is selected as the index key.

As to claim 18, Li et al. as modified teaches the method further comprising the steps of:

receiving a packet (see Li et al., column 2, lines 11-14);

applying the query key to the packet to produce a packet key (see Li et al., column 20, lines 13-41); and

searching the collection to detect a packet classification rule

matching the packet key (see Li et al., column 3, lines 52-57 and column 8, lines 13-15).

As to claim 19, Li et al. as modified teaches the method further comprising the steps of:

detecting multiple packet classification rules matching the packet key (see Li et al., column 3, lines 52-57 and column 8, lines 13-15); and

selecting a collision location key based on a common location to enable partitioning of the multiple packet classification rules (see Li et al., column 3, lines 52-57 and column 8, lines 13-15).

As to claim 20, Li et al. as modified teaches the method further comprising the steps of:

detecting multiple packet classification rules matching the packet key (see Li et al., column 3, lines 52-57 and column 8, lines 13-15); and

sequentially comparing each of the multiple packet classification rules with the packet to detect a matching rule (see Li et al., abstract and column 4, lines 8-16).

As to claim 22, Li et al. teaches a packet classification system, comprising:

a first memory for receiving a collection of packet classification rules, wherein each packet classification rule is represented as a plurality of binary locations (see column 9, lines 15-22 and column 9, lines 61-65); and

wherein each index key is based on a common location among the packet classification rules residing at a level, and enables partitioning of the packet classification rules into two or more siblings at another level (see figure 5 and figure 7).

Li et al. does not teach a mask constructor for selecting one or more index keys, and

wherein the mask constructor continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold.

Carr et al. teaches a method and apparatus for packet classification in a data communication system (see abstract), in which he teaches a mask constructor for selecting one or more index keys (see figure 2), and

wherein the mask constructor continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold (see figure 2).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al., to include a mask constructor for selecting one or more index keys, and

wherein the mask constructor continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al. by the teaching of Carr et al., because a mask constructor for selecting one or more index keys, and

wherein the mask constructor continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold, would enable the packet classification system, because the mask is used to refine the rule set to a form that is easily accessible later for packet classification.

As to claim 23, Li et al. as modified teaches wherein the mask constructor assembles the one or more index keys into a query key (see Carr et al., figure 2).

As to claim 24, Li et al. as modified teaches the system further comprising:

a key extractor for applying the query key to produce a refined rule collection from the collection located within the first memory (see Carr et al., column 3, lines 65-67 and column 4, lines 1-41); and

a second memory for storing the refined rule collection (see Carr et al., column 6, lines 8-10).

As to claim 25, Li et al. as modified teaches wherein the second memory is a content addressable memory (see Carr et al., column 3, lines 18-27).

As to claim 26, Li et al. as modified teaches the system further comprising:

a key extractor for applying the query key to an incoming packet to produce a packet key (see Li et al., column 6, lines 38-42).

As to claim 27, Li et al. as modified teaches the system of claim 26, further comprising:

a packet classifier for applying the packet key to detect a packet classification rule matching the packet key (see Li et al., column 3, lines 52-57 and column 8, lines 13-15).

As to claim 28, Li et al. as modified teaches wherein the key extractor is a multiplexor, wherein the multiplexor is configured to select field descriptors from the packet based on the query key (see Carr et al., figure 3, character "276" and column 11, lines 48-55).

As to claim 29, Li et al. as modified teaches wherein the multiplexor is a crossbar switch or a bit shifter (see Carr et al., column 4, lines 42-52).

As to claim 30, Li et al. teaches a computer program product comprising a computer useable medium having computer readable program code means embedded in the medium for causing an application program to execute on a computer used to classify packet flows, the computer readable program code (see column 16, lines 64-67 and column 17, lines 1-9).

Li et al. does not teach a first computer readable program code means for causing the computer to select one or more index keys,

wherein the first computer readable program code means selects each index key such that each index key is based on a common location among a set of packet classification rules residing at a level, and enables partitioning of the set into two or more siblings at another level, and

wherein the first computer readable program code means continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold; and

a second computer readable program code means for causing the computer to assemble the one or more index keys into a query key.

Carr et al. teaches a method and apparatus for packet classification in a data communication system (see abstract), in which he teaches a first computer readable program code means for causing the computer to select one or more index keys (see column 3, lines 65-67 and column 4, lines 1-9),

wherein the first computer readable program code means selects each index key such that each index key is based on a common location among a set

of packet classification rules residing at a level, and enables partitioning of the set into two or more siblings at another level (see column 3, lines 65-67 and column 4, lines 1-9), and

wherein the first computer readable program code means continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold (see column 3, lines 65-67 and column 4, lines 1-9); and

a second computer readable program code means for causing the computer to assemble the one or more index keys into a query key (see figure 1, character "20" and figure 2).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al., to include a first computer readable program code means for causing the computer to select one or more index keys,

wherein the first computer readable program code means selects each index key such that each index key is based on a common location among a set of packet classification rules residing at a level, and enables partitioning of the set into two or more siblings at another level, and

wherein the first computer readable program code means continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold; and

a second computer readable program code means for causing the computer to assemble the one or more index keys into a query key.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al. by the teaching of Carr et al., because a first computer readable program code means for causing the computer to select one or more index keys,

wherein the first computer readable program code means selects each index key such that each index key is based on a common location among a set of packet classification rules residing at a level, and enables partitioning of the set into two or more siblings at another level, and

wherein the first computer readable program code means continues to select index keys to repetitively partition each sibling at a respective level into two or more siblings at a lower level until reaching a partition threshold; and

a second computer readable program code means for causing the computer to assemble the one or more index keys into a query key would enable a computer program, because "This invention provides methods and apparatus for packet classification. The methods and apparatus use multi-level data structures, which have one level corresponding to each parameter value in a packet signature. Each level of the data structure contains conditions which may be matched by corresponding parameter values in the packet signature. The methods search for conditions, which match the corresponding parameter value of the packet being classified. In preferred embodiments, different search

engines may be used to search for matching conditions in different levels. The methods of the invention can provide fast classification", (see Li et al., column 3, lines 53-62).

5. Claims 15-17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. patent 6,567,408) in view of Carr et al. (U.S. patent 6,600,744), as applied to claims 14, 18-20, and 22-30 above, and further in view of Venkatachary et al. (U.S. publication 2002/0089937).

As to claim 15, Li et al. as modified still does not teach the method further comprising the steps of:

enabling addition and/or deletion of a packet classification rule in the collection; and

revising the query key in response to the addition and/or deletion of a packet classification rule.

Venkatachary et al. teaches packet matching method and system (see abstract), in which he teaches the method further comprising the steps of:

enabling addition and/or deletion of a packet classification rule in the collection (see page 1, paragraph 7 and page 4, paragraph 50); and

revising the query key in response to the addition and/or deletion of a packet classification rule (see page 4, paragraph 50).

Therefore, it would have been obvious to a person having ordinary

skill in the art at the time the invention was made to have modified Li et al., as modified, to include the method further comprising the steps of:

enabling addition and/or deletion of a packet classification rule in the collection; and

revising the query key in response to the addition and/or deletion of a packet classification rule.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al. as modified, by the teaching of Venkatachary et al., because the method further comprising the steps of:

enabling addition and/or deletion of a packet classification rule in the collection; and

revising the query key in response to the addition and/or deletion of a packet classification rule, would enable the method to update the primary rule memory each time a packet is received or sended to the receiver.

As to claim 16, Li et al. as modified teaches the method further comprising the step of:

performing the revising the query key on a periodically scheduled basis (see Carr et al., column 11, lines 7-15).

As to claim 17, Li et al. as modified teaches the method further comprising the step of:

performing the revising the query key on demand (see Carr et al., figure 4, character "400").

As to claim 21, Li et al. as modified still does not teach the method further comprising the step of:

enabling addition and/or deletion of a packet classification rule in the collection during the searching the collection.

Venkatachary et al. teaches packet matching method and system (see abstract), in which he teaches the method further comprising the step of:

enabling addition and/or deletion of a packet classification rule in the collection during the searching the collection (see page 1, paragraph 7 and page 4, paragraph 50).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Li et al., as modified, to the method further comprising the step of:

enabling addition and/or deletion of a packet classification rule in the collection during the searching the collection.

It would have been obvious to a person having ordinary skill in the

art at the time the invention was made to have modified Li et al. as modified, by the teaching of Venkatachary et al., because the method further comprising the step of:

enabling addition and/or deletion of a packet classification rule

in the collection during the searching the collection, would enable the method to update the primary rule memory each time a packet is receive or send to the receiver.

Allowable Subject Matter

6. Claims 7-9 and 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record, Li et al. (U.S. patent 6567,408), Carr et al. (U.S patent 6,600,744), and Venkatachary et al. (U.S. pub. No. 2002/0089937), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

wherein each of the selecting an index key step comprises the steps of:

measuring a difference in cardinality at each location coordinate that has not been selected previously as an index key; and

computing an optimization parameter for each location coordinate, as claimed in claim 7.

Claims 8-9 are objected to as being dependent from the objected to dependent claim 7.

The prior art of record, Li et al. (U.S. patent 6567,408), Carr et al. (U.S patent 6,600,744), and Venkatachary et al. (U.S. pub. No. 2002/0089937), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

wherein each of the selecting an index key step comprises the steps of:

measuring a difference in cardinality at each location coordinate that has not been selected previously as an index key; and

computing an optimization parameter for each location coordinate, as claimed in claim 11.

The prior art of record, Li et al. (U.S. patent 6567,408), Carr et al. (U.S patent 6,600,744), and Venkatachary et al. (U.S. pub. No. 2002/0089937), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

wherein the computing an optimization parameter comprises:

determining an evenness of division for siblings at a respective level; and

determining an average cardinality, as claimed in claim 12.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Belix M. Ortiz whose telephone number is 703-305-7605. The examiner can normally be reached on moday-friday 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-305-3830. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

bmo

May 26, 2004.

DOV POPOVICI
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